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Absorption of Ultrashort Laser Pulses by Solid Targets Heated Rapidly to Temperatures 1—1000 eV.* D. F. PRICE, R. M. MORE, R. E. STEWART, G. GUETHLEIN, D. GOLD, R. S. WALLING, W. E. WHITE, Lawrence Livermore National Laboratory — We have measured the absorption of high-contrast ultrashort pulses on a variety of solid targets over an intensity range of 10^{13} to 10^{18} W/cm^2. Our measurements give an experimental determination of the target energy content and an indirect measure of dense plasma electrical properties. The data include total absorption as a function of intensity and angle of incidence, and absorption on metal targets with oxide overlayers of varying thickness. Straightforward theoretical calculations accurately reproduce the behavior of aluminum targets, while the other materials show signs of an additional absorption mechanism. We have characterized this additional absorption for Al_2O_3 targets. At high intensity all target materials reach a "universal plasma mirror" state and reflect about 90% of the incident light.
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